Gerry C
Burners - ABT nozzle replacement / elbows
Mikejy - essential services taken o/s / up front

1/17/08
U2 major

2008 Unit Two Outage Area Coordination meeting
Boiler, Bottom ash, Unit Areas

1. Boiler will be scaffolded same as unit one. Will is going to get the boiler platform moved from the mezzanine to allow an area for scaffold staging. Engineered drawings will come from which ever sub gets the contract.

2. New boiler cleaning methods are being investigated. Companies will be on hand this month to demonstrate high pressure water blasting to remove slag.

3. Two Mogus valves will be replaced. Valves are in stock.

4. No Limitorque work will be done this outage, however, asbestos training for the valve crew will be completed prior to the outage to keep them updated. ACV work will be done by a different contractor though personnel may be the same. Scope is complete for this work prior to further inspections.

5. Soot blower penetrations will be sandblasted and tested by contractor. Sand blasting in the penthouse will be completed by contractor similar to unit one last year. Sand blasting on the throat tubes will be completed by IPSC and arrangement will have to be made to work at night. Contractor sandblasting will be done at night. Blankets need to be available to block dust from dropping below the throat scaffolding.

6. Two steam cooled spacer tubes will be repaired. Boiler penetrations will be done with 5 on the front and 6 in the roof similar to unit one. Tube shields and handcuffs will be placed as needed. Burners and elbows will be replaced. Downcomers will be cut at the bottom and inspected. Boiler throat tubes will be sand blasted by IPSC and repaired by AP&F if necessary. All internal boiler work will be done by AP&F.

7. Bay Valve will be on site to rebuild drum and main steam safeties. 78+ other safeties valves have been earmarked for testing and repair if needed. Testing will take place one week prior to the outage to allow repairs.

8. Over-fire air and secondary air dampers will be inspected and repaired as needed. Inspection and weld repairs will be done on the secondary air heaters. IPSC personnel expected to do that work. Air heater gearboxes will be inspected.

9. 2D pulverizer gearbox will be changed prior to the outage. 2B, G and F pulverizers will receive major overhauls by AP&F. IPSC mechanics will be changing pulverizer feeder belts and idlers. Redlers 203A and 204A will get major overhauls with new chains and liners. Surge hopper and 18A/B coal feeders will be repaired by AP&F. Boiler ash hopper discharge lines will be looked at for possible scaffolding to allow for pipes to be rotated or repaired.

10. Bottom ash refractory will be replaced. Many sections of bottom ash piping will be replaced. Seal trough piping will be replaced. Crushers, nozzles and normal maintenance.

John F - go thru tighters / not just AM
Alan-D

2008 Unit Two Outage Area Coordination meeting
Scrubber and Baghouse Areas

1. Three discharge outfalls, A, B and D will be re-coated. IPSC will water and sand blast, AP&F will repair and Gateway will spray coatings. D has a leak and may take additional work. D may also be drained to do forced oxidation header work. F module is expected to come out next week if it will seal.

2. Expansion joint just outside the chimney will be replaced by AP&F.

3. Blade repairs and damper bearing repairs will be done on the ID fans by AP&F.

4. Labor staffing in the scrubber will begin similar to unit one last year. IPSC laborers will be cleaning the laterals and nozzles.

5. There may be repairs done to several inlet turning vanes but this will increase scope of repairs and re-coating.

6. Scrubber sumps will be cleaned with guzzler assistance. We expect to have three trucks on site including ours.

7. ID fan drives will be cleaned and this is a possibility of some motor testing in possible and approved. Motors will be changed on the 1A FD fan and 2A PA fan. The rotor will be changed on the 1B FD fan. The outlet expansion joint will be replaced on the 2B PA fan. Weld repairs and stiffening will be done on the 1A and 1C reverse air discharge dampers.

8. Baghouse will be inspected and repaired as usual.

2008 Unit Two Outage Area Coordination meeting
Circulating Water Areas

1. Cooling tower fan stack repair will be done by Restruction on all 24 stacks. Internal preparation will begin prior to the outage on quadrant at a time. There was concern about electrical equipment removal for this work.

2. Consultant will be on site to inspect main condenser for tube erosion and possible prevention of the same.

3. Two more circ water pump impellers will be changed if the arrive in time. Circ pump discharge Rotork valves will be changed out.

4. Draining of the circ water tunnels will be similar to prior years except there will be only two tents used. 47 sections will be overlaid with carbon fiber repairs.

5. Cooling tower nozzles and headers will be cleaned similar to unit one. We expect to find less foreign matter.

6. Spot repairs will be done in the condenser waterboxes and the mixing trough may receive spot repairs depending on inspection.

2008 Unit Two Outage Area Coordination meeting
Main Turbine Areas

1. T1 through T4 main turbine bearings will be inspected. Tech Services in looking for a possible bound bearing since balance shots have failed in the past to have affect.

2. Both CRV's will be overhaul including intercept valves.

3. Main turbine turning gear will be disassembled and inspected.

4. Manway covers on the LP turbine shells will be remove to inspect last stage buckets. Consultant may be of assistance. A determination will be made how to prepare for LP turbine work and especially protection of condenser tubes from dropped objects.

5. Boiler feed pump turbine stop valves and control valves will be inspected. 1A boiler feed pump will receive a new volute.

6. Boiler feed pump turbine lube oil reservoirs will be drained for installation of new controls.

7. Buss duct work in the generator doghouse is likely to take place similar to unit one. There is a 1/16 to make further decisions.

8. Hit skid will start on Saturday. We will be using a super hit skid this year. Electricians will complete installation of a 100a service to power the bigger skid.

9. ESOP/EBOP testing will have to be coordinated with Operation since purging of the generator is not necessary to maintenance work.

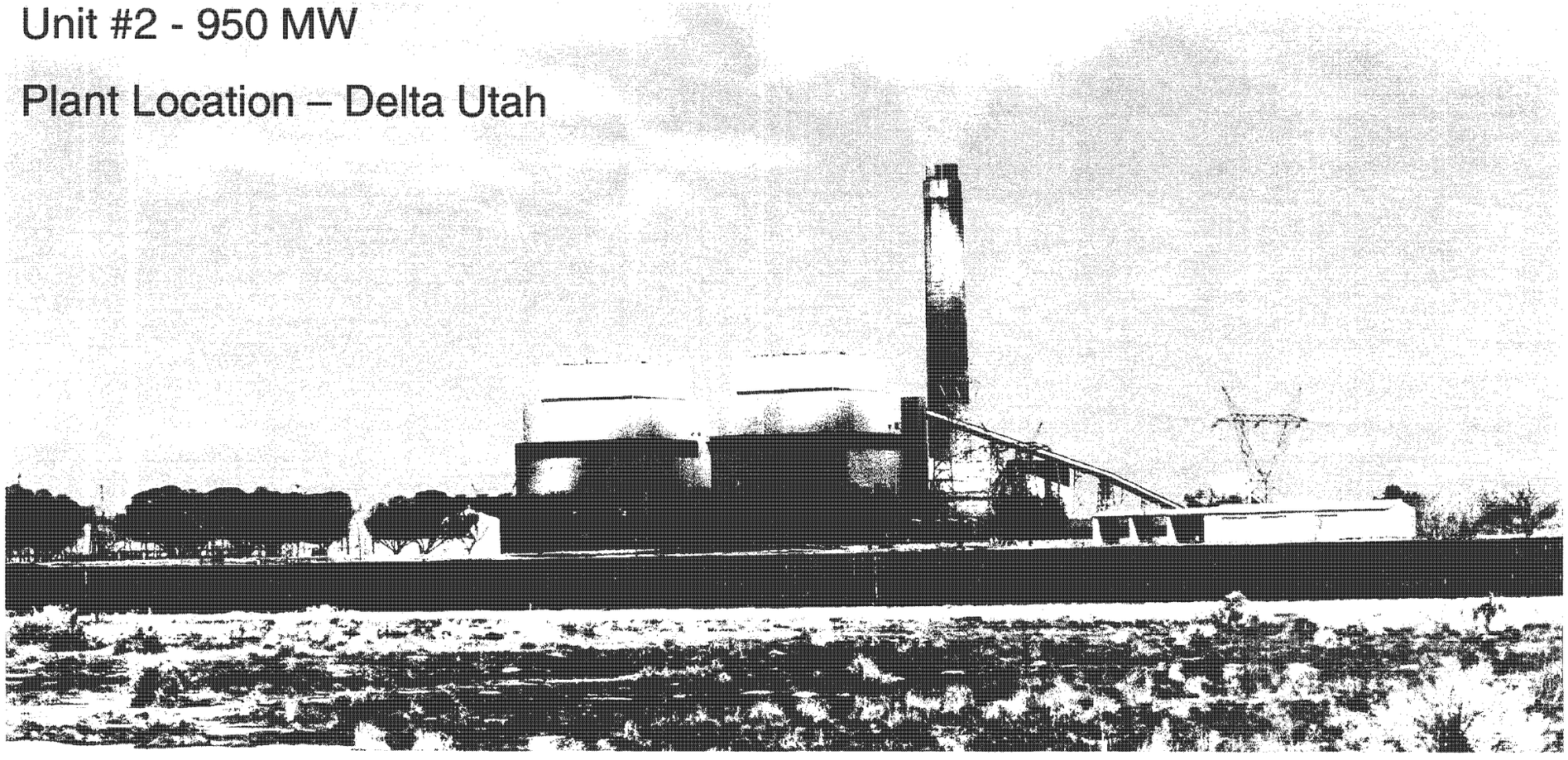
10. Main turbine over-speed testing can be complete at shutdown except for one test that requires intercept valves.

Intermountain Power Service Corp.
ABT Siemens Warranty Claim

SIEMENS

Unit #2 - 950 MW

Plant Location – Delta Utah



Date: October 17, 2007

IP7021167

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

ABT was awarded a contract in 2003 for the material supply of low NOx burners replacing existing B&W burners that had operated since 1992.

The base contract was for material supply only of 48 low NOx burners, 48 ABB Scanners plus air flow measuring equipment.

Approximately one year after commercial operation, the unit suffered a fire in one burner that destroyed the fuel injector. During the following Spring outage, Inspection revealed additional nozzles had cracks and excessive thinning of the fuel piping and nozzles.

April 2007, Siemens BTS and IPSC initiated a Six Sigma investigation to determine the root cause of the of the problems with the burners.

Siemens BTS and IPSC agreed on an issue statement with the five items:

1.) The alloy nozzle tip is cracking
2.) There is material loss at the following locations:
    - The burner nozzle tip
    - The "X" vane at the coal pipe elbow
    - The burner barrel
3.) The burner barrel is experiencing permanent deformation
4.) Establish the correct primary airflow for normal operation
5.) Definition of requirements for cooling air when the burner is out of service

The Six Sigma Root Cause analysis followed the five steps for a Six Sigma Project

Define: clear definition of the problem and the aim of the project

During the define stage, all available correspondence was collected, contract documents were collected, the involved parties were interviewed and an Issue Statement developed and agreed to.

Measure: Examination of the current process and collection relevant data for future analysis

The ABT design records were reviewed, the existing pulverizer performance at IPSC was documented and metallurgical analysis of the cracked burner nozzle was performed.

Analyze: Evaluation of the measured results and identification of the actual cause of the problem

CFD analysis and thermal modeling of the nozzles using the operating parameters as measured during the pulverizer testing was performed. A root cause analysis was generated.

Improve: Selection and implementation of the solution

A new burner design was generated using the information collected during the Define and Measure stage and CFD analysis undertaken to verify changes will

Control: Control of the changed process

The differences between the original design and the revised design need to be implemented and documented

Executive Summary

The alloy nozzle tip cracking is the result of erosion of the wall thickness in the nozzle due to higher than original air and coal flow. The thinner wall section weakened the nozzle to the point that the nozzle could not accommodate the stress generated by the differential expansion between the stainless steel nozzle and the carbon steel barrel.

There is material loss at the burner nozzle tip, "X" vane at the coal pipe elbow and the burner barrel are a result of coal and air flows being higher than design plus stratification of the coal particles in the coal pipe entering the 90° elbow.

The burner barrel is experiencing permanent deformation due to higher than expected temperatures at the interface between the nozzle and barrel. The burner barrel will use a SS spool piece to extend back into the burner barrel.

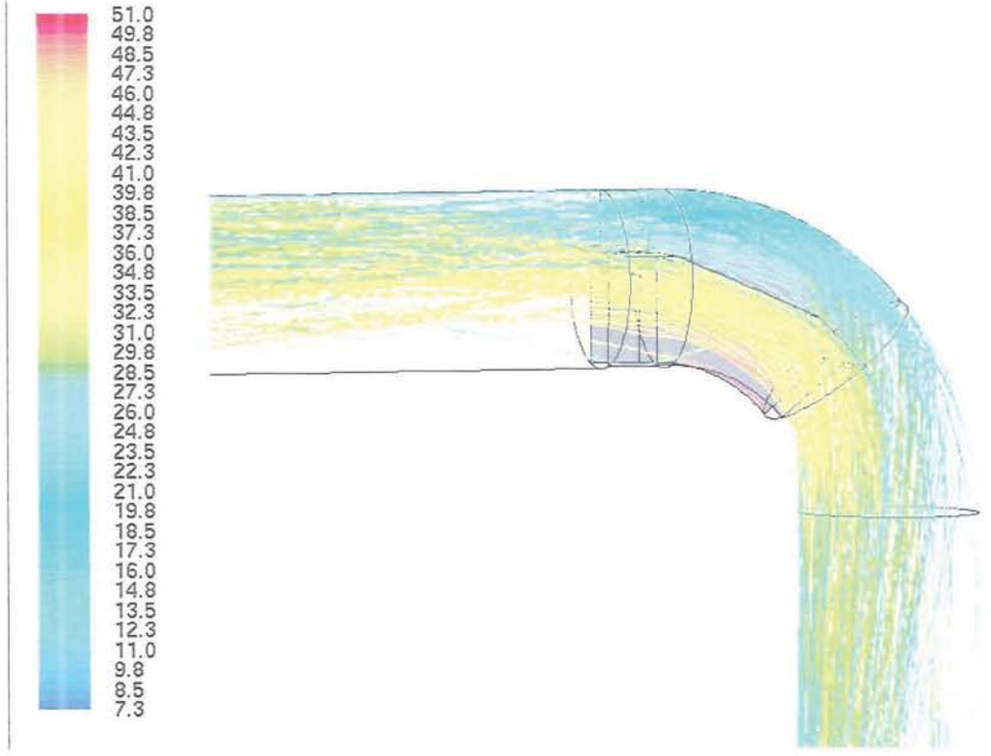
Establish the correct primary airflow for normal operation – The plant has not been operating per the B&W mill performance curve supplied in the contract. The mill curve supplied in the contract did not reflect the revision by B&W in 1992. Also, the plant has been operating at higher seal air flows

Definition of requirements for cooling air when the burner is out of service – the Operations and Maintenance manual will have to be revised to address out of service operation

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow



The CFD model shows the coal particles are stratified entering the elbow. The original kicker assembly with the X-vane that was modified to retain the clean out port will not last in the high velocity stream of concentrated coal particles with the higher coal flow.

The revised fuel injector design will increase the cross sectional area of the nozzle to reduce velocities, lengthen and flatten the slope of the transition ramp and replace the round elbow with a "Flat back" design to allow dispersion of the coal particles across the flow area of the nozzle.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow

Erosion is originating at the transition slope from the round barrel to the 6 lobe exit. This is consistent with the results of the CFD model. The metallurgical analysis performed by Tordonato Energy Consultants identified erosion as a the contributor cause of the nozzle cracking. The high temperatures at the weld between the nozzle and burner barrel increased the stress which also contributed to the cracking. There was no evidence of corrosion.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

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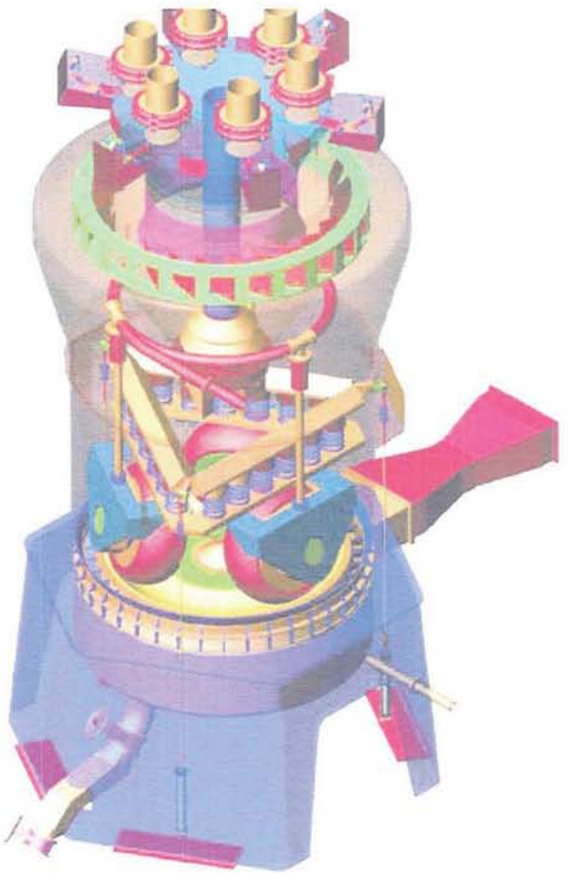
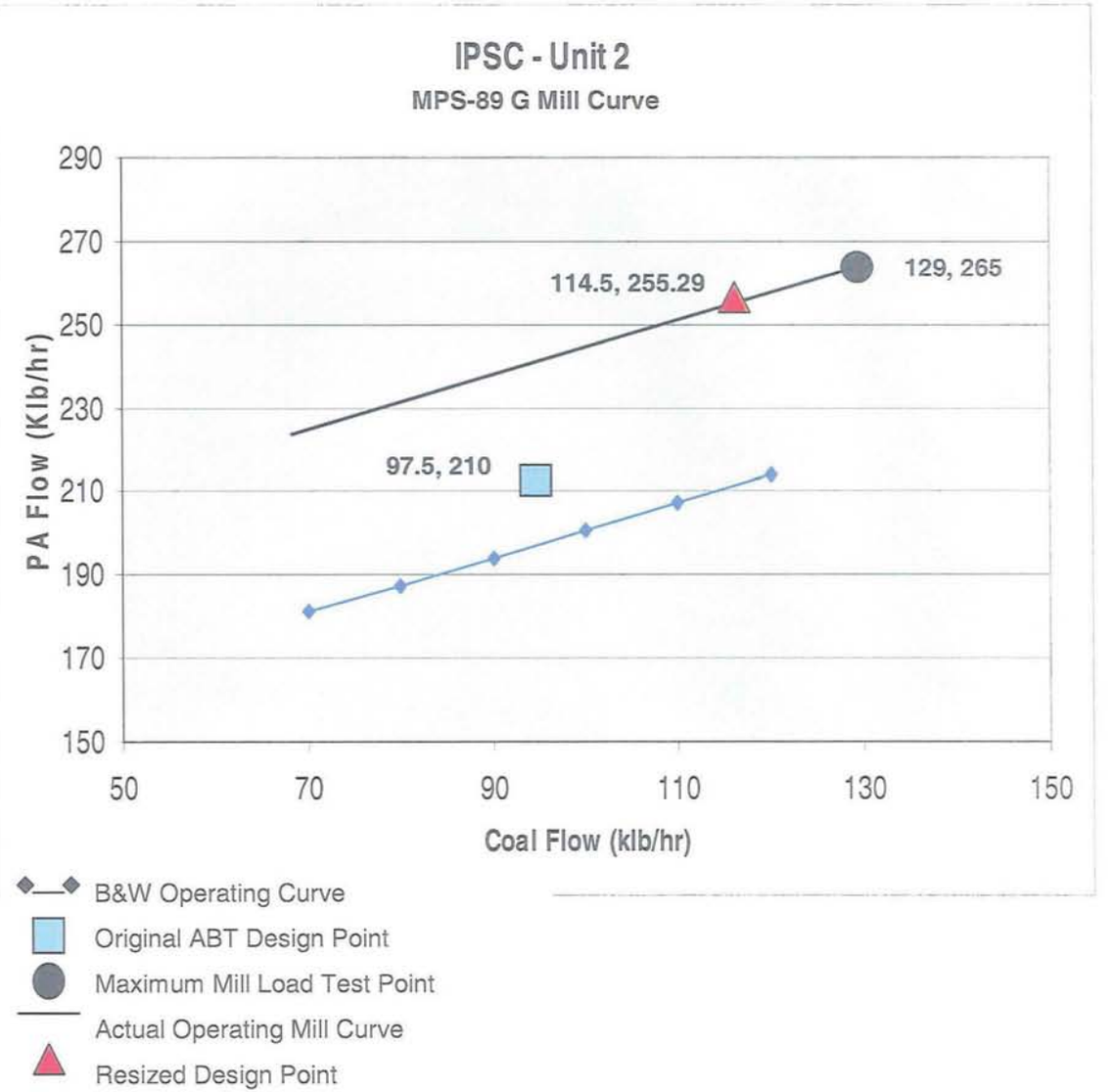
Erosion and Mill Air Flow

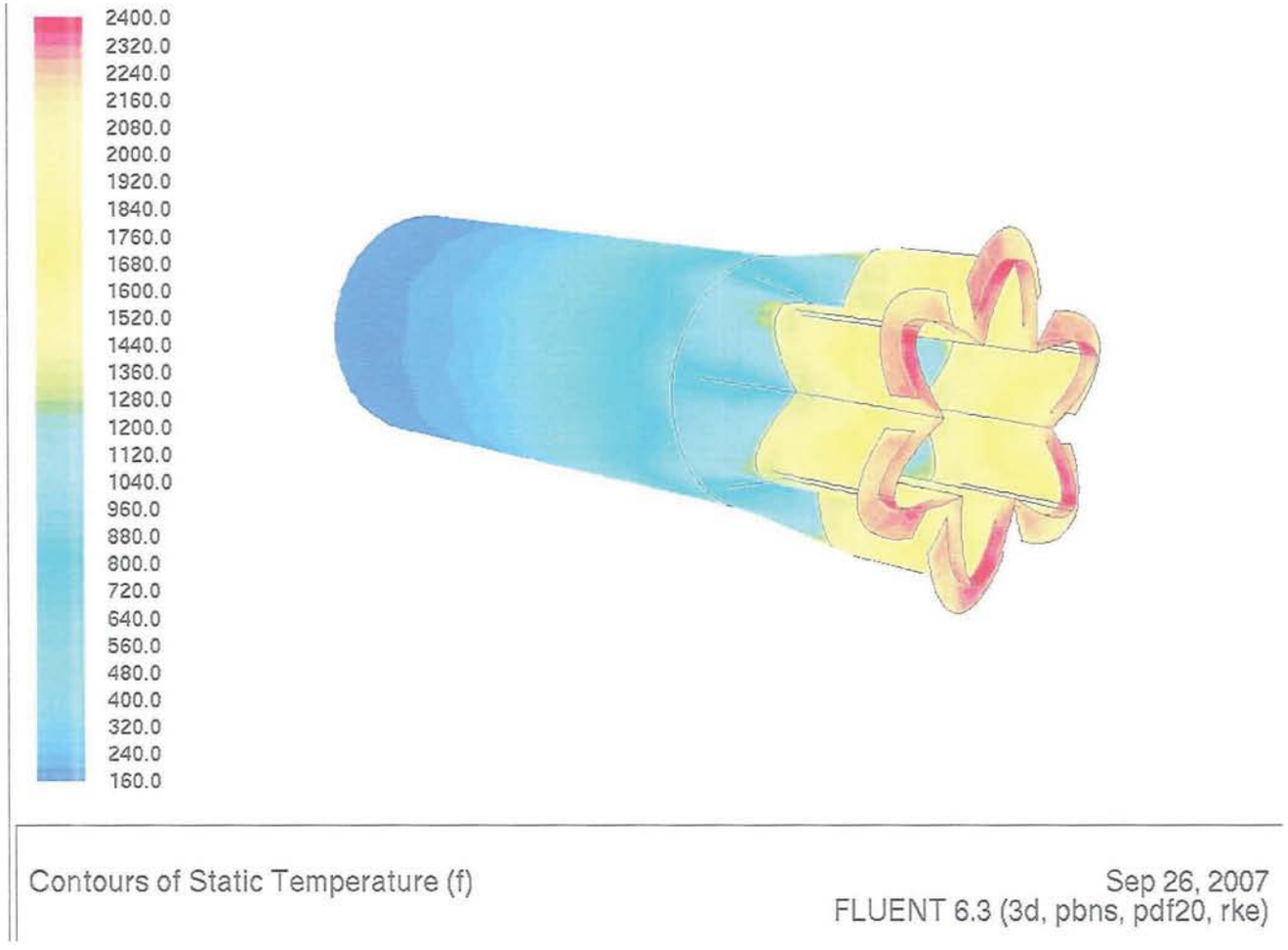




Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Thermal Stress



The furnace radiation model shows that the heat conducted back to the burner barrel to be higher than expected. The revised fuel injector will use a spool piece of 253MA stainless steel to make the transition from the nozzle to the barrel. The revised fuel injector shall use refractory tile to shield the burner barrel from radiation from the furnace and to minimize erosion. This thermal model does not model the cooling of the secondary air on the tip.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Thermal Stress

The off line burners are plugging with slag indicating that furnace gases are back flowing into the nozzle area. This creates very high temperatures that the nozzles were not designed for. A minimum air flow required to prevent this must maintained.

Intermountain Power Service Corp
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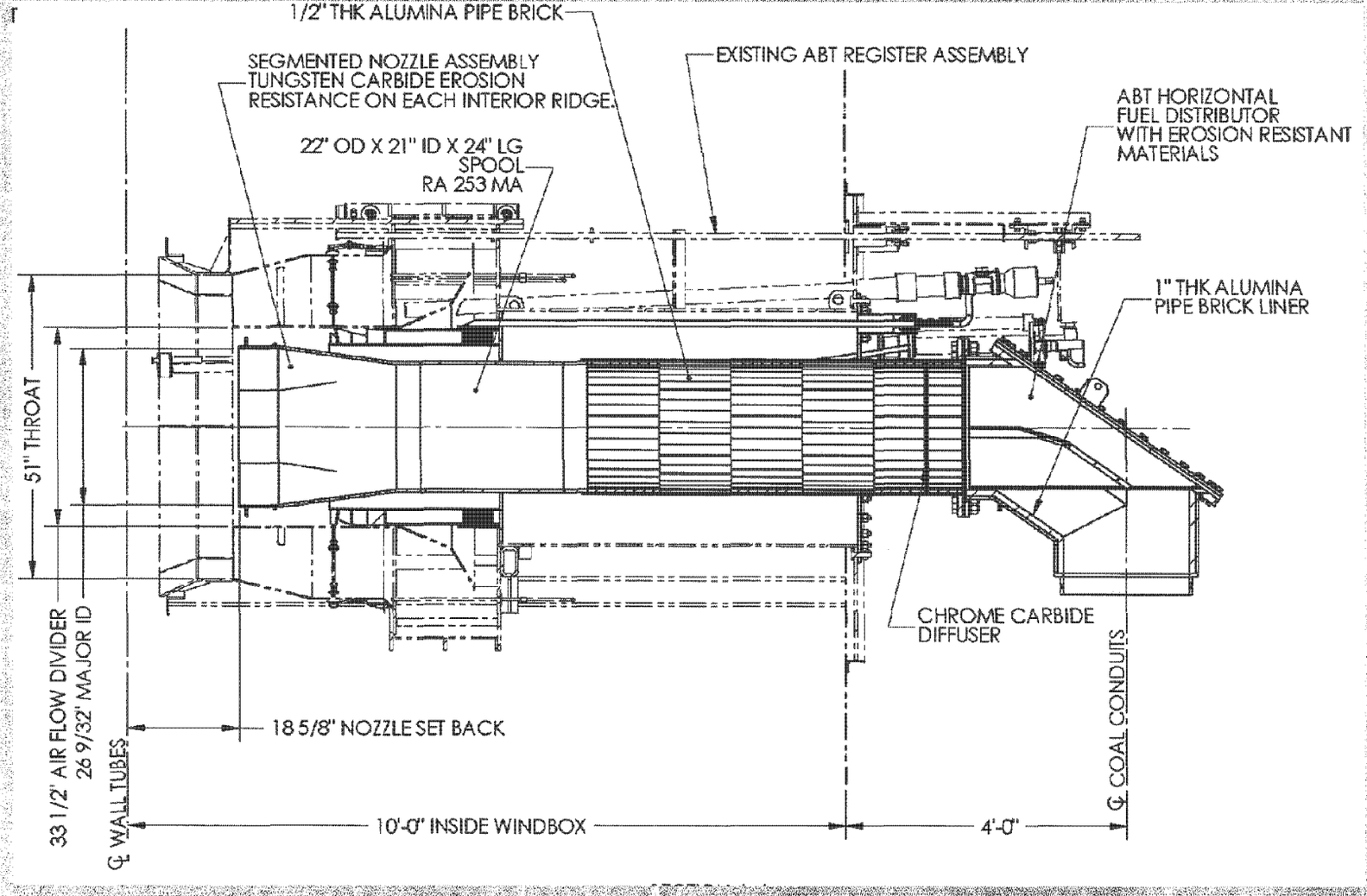
SIEMENS



Next Steps

Close Out Six Sigma Program

- Commercial agreement between IPSC and Siemens Power Generation Inc
- Agreement on Division of Responsibilities